

This appendix contains instructions for administering an oral double auction. The instructions are based on those widely used in experimental economics, but they are written for demonstration rather than research purposes.⁵⁰ It is assumed that neither the experiment administrator nor the participants have experience with double auctions. Additional examples and explanations have been added to anticipate many common mistakes and questions. Some of the explanations may consequently seem rather tedious to an experimentalist, and some of the sequences of bids and offers in the Trading Rules section may be a little too suggestive of actual trading strategies for research purposes. To adapt these instructions for use as a research tool, we suggest removing the material marked with brackets.

This appendix is divided into two parts. The first part contains instructions for participants, while the second part presents a detailed list of administrative tasks associated with conducting a laboratory market session. Although many of these tasks also apply to other types of experiments, the discussion here is in terms of a double auction, since lists of procedural guidelines are both clearer and more interesting when they are presented in the context of a specific experiment. Tasks necessary for a classroom demonstration are marked with an asterisk to distinguish them from those that are only necessary for research purposes.⁵¹ Most of the lists are also relevant if the experiment is computerized, but fewer assistants and less paper and preparation materials are required.

⁵⁰ There are a variety of instances where one might use a laboratory trading session for purposes of demonstration. In particular, it is useful to conduct a double auction in an initial meeting of an experimental economics course, before students have done any reading in chapter 1. An exercise of this type not only demonstrates the robust convergence of the double auction, but it also directs the attention of students to the links between theoretical predictions and evidence. The authors often have participants record data from the classroom session, as well as the underlying cost and value parameters for the market. Students are then asked to consider theories explaining why the (typically rather stable) series of prices was observed. A subsequent class discussion would focus on the empirical consequences of theories, and on how the predictions of rival theories may be behaviorally distinguished.

⁵¹ For an alternative, somewhat more detailed list, see Plott (1986b).

A1.1 Oral Double-Auction Instructions [for demonstration]

Today we are going to set up a market in which some of you will be buyers and others will be sellers. The commodity to be traded is divided into distinct items or "units." We will not specify a name for the commodity; we will simply refer to units.

Trading will occur in a sequence of trading periods. The prices that you negotiate in each trading period will determine your earnings, in dollars and cents. You will keep track of these earnings on the forms provided. [These earnings are hypothetical; nobody will make or receive actual cash payments.]⁵²

We will proceed in the following way. First I will explain how buyers and sellers compute their earnings, and then I will explain how sales and purchases are arranged in the market. Importantly, these instructions explain how both sellers and buyers calculate earnings and negotiate contracts. In today's market, however, you will be either a buyer or a seller. Information specific to your role in today's market will be presented to you at the end of the instructions. After reading the instructions and reviewing your specific information, I will give you a chance to ask any questions you might have. Then we will begin the first trading period.

Instructions for Sellers

Seller decisions and earnings will be recorded on a sheet similar to the Seller Decision Sheet, shown below. Trading periods are designated by separate columns. In each trading period, a seller may sell up to two units. For the first unit that may be sold during a period, the seller incurs a cost of the amount listed in row 2, marked "cost of 1st unit." If a second unit is sold during the same period, the seller incurs the cost listed in row 5, marked "cost of 2nd unit." A seller may sell one or both units in a period and may sell to either a single buyer or different buyers.

Sellers earn money by selling units at prices that are above their costs. Earnings from the sale of each unit are computed by taking the difference between the sales price and the unit cost. Total earnings for the period are computed by adding up the earnings on all units sold.

Consider, for example, trades in period 0 of the Seller Decision Sheet. In this practice period, the cost for the first unit is \$130, and the cost for the second unit is \$140, as shown in rows 2 and 5. Suppose a seller negotiates sales of both units in period 0; the first unit for a price of \$190 and the second unit for a price of \$160. To record these sales, please enter \$190 in row 1 and \$160 in row 4 of the Seller

⁵² If cash earnings are to be paid, substitute the following: All money that you earn during the trading will be yours to keep and will be paid to you, privately, in cash at the end of the session today. These earnings are in addition to the \$_____ initial payment that the assistant will give to each of you at this time.

unit		trading period			
		0	1	2	3
1st unit	1	selling price			
	2	cost of 1st unit	\$130		
	3	earnings			
2nd unit	4	selling price			
	5	cost of 2nd unit	\$140		
	6	earnings			
7	total earnings for the period	(not paid)			
	8	cumulative earnings	\$0,000		

A Sample Seller Decision Sheet

Decision Sheet. Remember to stay in the shaded column for period 0.

Earnings on the sale of the first unit are obtained by subtracting the cost in row 2, which is \$130, from the selling price in row 1, which is \$190. The difference of \$60 should be entered in row 3 at this time. Similarly, everyone should compute the earnings from the sale of the second unit and enter it in row 6. Total earnings for the period would be the sum of \$60 (on the first unit sold) and \$20 (on the second unit sold). If this were not a practice period, this sum of \$80 would row be entered in row 7. Earnings in this example are for illustrative purposes only; actual earnings will be lower.

Subsequent periods are represented by numbered columns: period 1, period 2, etc. The blanks in each column of the Seller Decision Sheet will help sellers to keep track of their earnings in a period. But please remember: all calculations for each period should be reflected in the column *for that period*.

Importantly, a seller does not incur the cost for a unit unless the unit is sold. Thus, earnings for each unsold unit in a period are zero. If you are a seller, the first

unit you sell during a trading period is *your* "1st unit," regardless of whether or not other sellers have previously sold units in the period. The sale price for your first unit should be recorded in row 1 immediately after the sale, and the earnings should be recorded in row 3. If you sell a second unit, record its sale price in row 4 immediately. You cannot sell your second unit before your first unit, and therefore you will move *down a column* during a period. Units listed on adjacent columns are unavailable until subsequent trading periods. At the end of the period, record your total earnings in row 7 of your decision sheet. Earnings for subsequent periods will be calculated similarly, and you should keep track of your cumulative earnings in the bottom row of the decision sheet.

Instructions for Buyers

Buyer decisions and earnings will be recorded on a sheet similar to the Buyer Decision Sheet, shown below. This sheet is formatted in a manner parallel to the Seller Decision sheet, with trading periods designated by separate columns. In each trading period, a buyer may purchase up to two units. For the first unit that may be bought during a period, the buyer receives the amount listed in row 1, marked "value of 1st unit." If a second unit is purchased during the same period, the buyer receives the additional amount listed in row 4, marked "value of 2nd unit." A buyer may purchase one or both units in a period and may buy from either a single seller or different sellers.

Buyers earn money by purchasing units at prices that are below their values. Earnings from the purchase of each unit are computed by taking the difference between the value of the unit and the purchase price. Total earnings for the period are computed by adding up the earnings on all units purchased.

Consider, for example, purchases in period 0 of the Buyer Decision Sheet. In this practice period, the value of the first unit is \$210 and the value of the second unit is \$170, as shown in rows 1 and 4. Suppose a buyer negotiates the purchase of two units in period 0; the first unit for a price of \$160 and the second unit for a price of \$150. To record these purchases, please enter \$160 in row 2 and \$150 in row 5 of the Buyer Decision Sheet. Remember to stay in the shaded column for period 0.

Earnings on the purchase of the first unit are obtained by subtracting the purchase price in row 2, which is \$160, from the value in row 1, which is \$210. The difference of \$50 should be entered in row 3 at this time. Next, everyone should compute the earnings from the purchase of the second unit and enter it in row 6. Total earnings for the period would be the sum of \$50 (on the first unit purchased) and \$20 (on second unit purchased). If this were not a practice period, this sum of \$70 would now be entered in row 7. Earnings in this example are for illustrative purposes only; actual earnings will be lower.

Similarly, and you should keep track of your cumulative earnings in the bottom row of the decision sheet.

Trading Rules

I will begin each five-minute trading period with an announcement that the market is open. At any time during the period, any buyer is free to raise his/her hand and, when called on, to make a verbal bid to buy a unit at a price specified in the bid. Similarly, any seller is free to raise his/her hand and, when called on, to make a verbal offer to sell a unit at the price specified in the offer. All bids and offers pertain to one unit, it is not possible to sell two units as a package.

All buyers and sellers have identification numbers; your number is given in the upper part of a Decision Sheet that is in your folder. These numbers should be used when making a bid or offer. Buyers should use the word "bid," and sellers should use the word "ask." For example, if Buyer 1 wants to make a bid of \$120, then this person would raise his/her hand and, when recognized, say "Buyer 1 bids \$120." I will repeat the buyer number and the bid to give the person at the blackboard time to record it. Similarly, if Seller 5 decides to offer a unit for sale at \$250, this seller should raise his/her hand and, when recognized, say "Seller 5 asks \$250." I will repeat this information while it is recorded, and the blackboard will appear

Bids	Asks
B1 120	S5 250

We ask you to help us enforce a bid/ask improvement rule: All bids must be higher than the highest outstanding bid, should one exist, and asking prices must be lower than the lowest outstanding offer, should one exist. In the example above, the next bid must be above \$120, and the next ask must be below \$250.

[For example, suppose that Buyer 1, the next person recognized, raises his/her own bid from \$120 to \$130, and then Seller 4 is called on and asks \$165. I would repeat the bid and ask as they are recorded on the blackboard:

Bids	Asks
B1 120	S5 250
B1 130	S4 165

BUYER DECISION SHEET for BUYER _____

unit	row	trading period			
		0	1	2	3
1st unit	1	value of 1st unit			
	2	purchase price	\$210		
	3	earnings			
2nd unit	4	value of 2nd unit	\$170		
	5	purchase price			
	6	earnings			
	7	total earnings for the period	(not paid)		
	8	cumulative earnings	\$6.00		

A Sample Buyer Decision Sheet

Subsequent periods are represented by separate columns; period 1, period 2, etc. The blanks in each column of the Buyer Decision Sheet will help buyers to keep track of their earnings in a period. But please remember, all calculations for each period should be reflected in the column for that period.

Importantly, a buyer does not receive the value for a unit unless the unit is purchased. Thus, earnings for each unpurchased unit in a period are zero. If you are a buyer, the first unit that you purchase during a period is your "1st unit," regardless of whether or not other buyers have previously bought units in the period. The purchase price for your 1st unit should be recorded in row 2 immediately after the purchase, and the earnings should be recorded in row 3. If you buy a second unit, record its purchase price in row 5 immediately. You cannot buy your second unit before your first unit. Therefore, you will move down a column during a period. Units listed in subsequent columns are not available until subsequent trading periods. At the end of the period, record your total earnings in row 7 of your decision sheet. Earnings for subsequent periods will be calculated

To save space, the bids and asks will be written in small numbers, without the dollar signs and decimals. Please tell us if you cannot read the numbers recorded or if you think that a bid or ask was not recorded correctly.

Any seller is free at any time to accept or not accept the bid of any buyer, and any buyer is free to accept or not accept the asking price of any seller. To accept a bid or ask, simply raise your hand. After you are recognized, announce your identity and indicate acceptance, e.g., Buyer 2 accepts Seller 3's ask.

[Suppose that Buyer 3 bids \$160, and that the next person recognized is Seller 5 who accepts this bid. I would repeat this acceptance, while the person at the blackboard circles the buyer number, seller number, and transactions price. To see how this will look, please draw a flat circle around the boldfaced row in the following chart.

Bids	Asks
B1 120	S5 250
B1 130	S4 165
B3 160	S5 accepts

Instead of accepting the bid of \$160, Seller 5 could have stated an asking price that is below the highest outstanding bid, say at \$150, but to do so would result in a lower sale price than could have been obtained by accepting the bid of \$160.

If a bid or ask is accepted, a binding contract has been closed for a single unit, and the buyer and seller involved will immediately record the contract price and earnings for the unit. After each contract is closed, all previous bids and asks will be automatically withdrawn before any new ones can be made.

[Following the acceptance of Buyer 3's bid of \$160, a horizontal line would have been drawn below the circled contract. Subsequent bids need not be above \$160 and in fact could be below any of the earlier bids. The horizontal line is to remind you that the contract invalidates previous bids and asks.

If Seller 4 wished to ask \$165 again, this seller would raise his/her hand and be recognized. Suppose that Buyer 1 bids \$140 and Buyer 3 is then recognized and accepts Seller 4's asking price. The blackboard will appear as below, except that the parties to a contract will be circled instead of boldfaced.

Bids	Asks
B1 120	S5 250
B1 130	S4 165
B3 160	S5 accepts
B1 140	S4 165
B3 accepts	

Notice that Buyer 3 has just purchased his/her second unit. Instead of accepting the lowest standing offer of \$165, this buyer could have made a higher bid, say \$170, but to do so would have resulted in a higher purchase price than would have been obtained by accepting the offer of \$165.]

Except for bids, asks, and their acceptances, you are expected not to speak to any other person, even if there are many bids and offers that are not accepted.

Procedural Details and Review

In your folder, you will find a sheet, labeled "Buyer Decision Sheet" or "Seller Decision Sheet." This sheet is separate from these instructions. It identifies your role as a buyer or seller and will be used to calculate your earnings. THE INFORMATION ON THIS SHEET IS PRIVATE, PLEASE DO NOT REVEAL IT TO ANYONE. Others may or may not have the same cost or value numbers that you have. You should now look at your decision sheet to see whether you are a buyer or a seller. Has everyone done this? Also, please note your identification number at the top of this sheet; this is how you will identify yourself during the trading process.

Now is the time for questions. You may ask questions about any aspect of the market of which you are unsure. However, be careful not to reveal the private cost or value information that appears on your decision sheet. Are there any questions?

(Questions)

We are about to begin trading period 1. Buyers should check the redemption values in rows 1 and 4 of the column for period 1. Recall, the only way for a buyer to earn money on a unit is to purchase it for a price that is below its redemption

value.⁵³ Similarly, sellers should check the cost numbers in the column for period 1. Recall, the only way for a seller to earn money on a unit is to sell it for a price that exceeds its cost.⁵⁴ Barring any further questions, we will begin trading period 1. Are there any remaining questions?

(Questions)

Beginning the Session

The market is now open for bids and offers. If you raise your hand, please do not speak until I call on you. I will do my best to call on people in the order in which the hands went up, but if many hands go up at the same time I will have to choose between people in a nonsystematic way. The period will last for _____ minutes and will end at _____. Are there any bids or asks?

(After the first contract is made, but not after subsequent contracts, read the paragraph that follows.)

At this time the buyer and seller involved in this contract should record the price and calculate their earnings. This buyer and seller now have finished with their first units, and the relevant value or cost for them is that of their second unit for period 1. The rest of you are still considering the sale or purchase of your first unit in the period 1 column. Remember that when you make a contract, you move down the column for the current period to your second unit; you do not move across a row until the beginning of the next period. At this time, the recorder should draw a horizontal line below the final bids and asks. There are _____ minutes remaining in period 1, and the market is open for bids and asks.

(At the appropriate times, the one-minute and 30-second warnings are given. At the end of the period, read:)

Period 1 has ended, and you should add up the earnings on units traded and enter the total in row 7 of the column for this period. If you did not buy or sell a unit, the earnings for that unit are zero. We will erase the blackboard as soon as all transaction prices are recorded. At this time, one of us will come around to your desk to check your calculations. Please do not talk with each other; if you have a question, raise your hand.

⁵³ If trades at a loss are not permitted, insert: Buyers will not be permitted to make a purchase at a price that exceeds their redemption value for the unit.

⁵⁴ If trades at a loss are not permitted, insert: Sellers will not be permitted to make a sale at a price that is less than their cost for the unit.

Ending the Session (The following statement is to be read at the end of a research session.)

The final period has ended. Please refrain from talking while you finish adding up your cumulative earnings across periods in row 8. One of us will come around to assist you with this if necessary. Then add the \$____ participation fee (paid previously) to the total and round the result up to the nearest 25-cent increment (e.g., \$5.35 becomes \$5.50). Enter the total on the receipt form that you will find in your folder. Please fill out the rest of the receipt form, making sure that you include the date, your signature, and your social security number. Then remain seated without talking until you are asked to take your receipt form to be paid. Please leave all other materials in the folder on your desk. Thank you for your participation.

A1.2 Suggestions for Conducting an Oral Double Auction

This section contains practical considerations that may help in the administration of an experiment. Our suggestions are organized into a series of lists that address concerns in approximately chronological order. The categories include experimental design, advance arrangements, preparation of folders and materials, recruiting, room preparation, starting the session, controlling the market trading, and ending the session.

Much more detailed planning is required for conducting a market for research than for demonstration purposes. In the latter case, attention may be confined to comments marked with an asterisk. Finally, although our listed considerations apply fairly generally to experimental sessions other than double-auction markets, they are intended to be definitive in any application. In designing and conducting an experiment, the researcher should keep in mind the general principles of replicability, motivation, calibration, control, and unbiasedness discussed in the text.

Experimental Design

*1. Decide on the numbers of buyers and sellers. These numbers depend on the purpose and design of the experiment, but it is unwieldy to conduct an oral double auction with more than fifteen to twenty traders. In addition, it is useful to have four extra people to help:

- i. an *auctioneer* to read instructions and recognize buyers and sellers (this would be the instructor in a classroom demonstration)
- ii. a *first recorder* to record bids, asks, and contracts on the blackboard
- iii. a *second recorder* to record data on paper and keep time

- iv. a *monitor* to check for illegal trades (e.g., trades at a loss if they are not permitted)

If there are extra students present in a classroom demonstration, you can distribute decision sheets to every second or third person and let students who are not participating assist those who are.

*2. Decide on value and cost parameters. The participant decision sheets in the instructions given above contain space for two units per person for a maximum of three trading periods. Increases in the numbers of units or periods would require straightforward changes in the instructions and decision sheets. No modification is necessary if you use variants of the design discussed in section 1.3 (summarized in table 1.1).⁵⁵

3. Decide whether to permit trades at a loss (sales below cost or purchases above value). In our experience, there will sometimes be trades at a loss in the first period with inexperienced subjects. If trades at a loss are not permitted, extra monitoring will be required, see item 1.iv in this list. Even if such trades are permitted in a demonstration experiment, you may wish to explain (privately) why the trade will result in a loss.

4. Decide on parameter shifts. For research sessions, it is essential to avoid the possibility that prior expectations will affect behavior. After a session ends and participants have left the room, they may talk with other potential participants. In oral auctions, there is also the possibility that the auctioneer can affect outcomes, perhaps inadvertently, through facial expressions. One solution is to add a parameter-disguising constant to all values and costs, and to keep the auctioneer uninformed of the equilibrium price. Decide on the length of the periods. Trading will go more quickly after the first period or two, so shorter periods may be used in a research experiment if trading volume is not too large. As a rough guide, count on about forty-five seconds per unit that is expected to trade. Changes in the time limits will require obvious changes in the instructions.

⁵⁵ This design has a number of features that are desirable for purposes of demonstration, including symmetry (which tends to speed convergence), and clean separation between the competitive prediction and rival predictions such as monopoly, monopsony, and quantity maximization. The numbers of buyers and sellers may be easily modified in a way that retains the design's desirable features. For example, an additional buyer and seller pair may be added to table 1.1 as follows. Key new buyer B7's values off of those for B6: Make B7's first unit worth .10 more than B6's first unit and B7's second unit should be worth .10 less than B6's second unit. The new seller S7 should be given a first unit that costs .10 less than S6's first unit, and then given the second unit previously held by S6 as a second unit. Then set the cost of S6's second unit to .10 more than the cost of S5's second unit. The addition of trader pairs in this manner preserves the difference between quantity maximization and competitive predictions.

Advance Arrangements

1. Hire four assistants to cover the roles described above, and stress the need to arrive on time.
2. Instruct assistants not to talk unnecessarily during the experiment and not to provide suggestive or colorful answers to questions.
3. Reserve the room for the time needed, plus about fifteen minutes before the starting time and about thirty minutes afterward, to reduce "end-effects" and to prevent a situation in which students for an incoming class are crowding around the doorway.
4. When paying earnings in cash, obtain sufficient change, usually a roll of quarters and the rest in \$1, \$5, and \$10 bills. Note that the maximum earnings may be calculated in advance as the product of the number of periods and the sum of buyers' and sellers' surplus. To facilitate the making of change, bills should be primarily in small denominations.

Preparation of Folders and Materials

- *1. Photocopy instructions for all participants, assistants, and observers. (For research sessions, remove "T" chart examples from the Trading Rules section of the instructions, as indicated by the square brackets.)
- *2. Photocopy enough buyer and seller decision sheets, excerpted from the above instructions.
- *3. Write the buyer or seller identification numbers at the top of each decision sheet. Unlike the example in section 1.3, there is probably less chance of mistaken identity if you use low numbers for buyers and high numbers for sellers, with no overlap.
- *4. Write the buyers' values and sellers' costs, for each unit and for each period, on the appropriate decision sheets.
- *5. Check to be sure that values and costs are recorded correctly and in the appropriate rows: 1 and 4 for buyers' values and 2 and 5 for sellers' costs. For a more thorough check, use the subjects' own decision sheets to reconstruct the market supply and demand functions.
- *6. Make a folder for each participant with the identification number written on the folder and the following included: instructions, decision sheet marked with participant's identification number and cost or value parameters, and receipt form (if you are paying earnings in cash and will be reimbursed).
- *7. Make a folder for yourself, with a copy of the instructions to be read and extra copies of receipt forms for alternates.
- *8. Make a folder for each assistant, with instructions for all, a pad of paper for the person who records contracts, and, if relevant, a list of demand and cost parameters for the person who is to check for illegal trades (sales below cost or

purchases above value). An example of such a list is given in section 1.3. It is most convenient to have multiple copies of the parameter list (one for each period) so the assistant can mark off units as they are traded.

*9. Bring extra pens for participants.

Recruiting

1. Prior to the day of the session, go to classes just at the beginning of class, with the instructor's prior approval, and use a prepared announcement to obtain a list of potential subjects. Ask the instructor not to make a speech about experimentation after you finish.
2. Use an announcement that is not suggestive about the type of behavior expected in the experiment, for example:

You are invited to participate in one or more economics experiments that will be conducted in the next several months at the _____ (name of college or university) under the supervision of Professor _____.

The experiment involves an economic decision-making situation, and if you participate, you will be paid \$_____ for appearing promptly at your scheduled appointment time. In addition, you will be able to earn money during the session, which will last about two hours. These earnings will be determined by your decisions and by the decisions of other participants. We cannot say in advance exactly what your earnings will be, but they will typically exceed the compensation that you would receive for working a comparable number of hours. All earnings will be paid in cash immediately after the session.

There will be a number of sessions, each of which will last for about two hours. If you are interested in participating in one or more sessions, please supply the information requested below and return this sheet. If you do so, someone from the Economics Department will call you later to arrange a specific time and place. Thank you.

Your Name _____
 Phone (day) _____
 (evening, if different) _____
 Please indicate which times are most likely to be convenient this semester; feel free to indicate more than one time:
 _____ 1530-1730 on a Tuesday
 _____ 1530-1730 on a Wednesday
 _____ 1530-1730 on a Thursday

3. When calling individuals who have expressed interest in participation, identify yourself, be polite, and do not oversell, since a reluctant subject is unlikely to show up. A possible approach:

Hello, this is _____ calling from the Economics Department about the experiment in which you expressed an interest. We're organizing a session tomorrow from _____ to about _____ in the afternoon (morning). Are you able to come? (If not, thank them and ask if they would like to be called again.) Do you have a pen to record the time and place? (Record the person's name on the participant list while they are going to get a pen.) The experiment will be held in room _____ of _____ (building) at _____ p.m. (a.m.) tomorrow. There is no need to arrive early, but we cannot start until everyone is present, so please come on time. We need to have an exact number of people, so if you must cancel *for any reason*, please call us at _____ and leave a message saying that you will not come. We always recruit a couple of extras in case someone cancels at the last minute. As mentioned in the class announcement, we will pay everyone \$_____ for showing up, and therefore if all of the positions are taken when you arrive, we will pay you this amount and call you back another day. If you participate, all money that you earn in the session (plus the participation payment) will be paid to you in cash immediately afterward. You do not need to bring anything.

4. In some situations, on-the-spot recruiting is preferred to telephone recruiting.⁵⁶ To do this, divide the above recruiting announcement that is read in class into two parts. There should be a place for the student's name and phone number on the top part (names are needed so that unexpected substitutes can be turned away at the time of the experiment). The bottom part should be a tear-off part containing the time and place of the session. Instruct participants that returning the top part with their name and phone number written in the blanks indicates their intention to show up on time. It helps to confirm the details by phone with subjects who can be reached.

5. With either method of recruiting, you should be able to answer questions in a manner that reassures prospective subjects and arouses interest, without introducing biased expectations. Some useful comments: "This is not a test or an exam, it is not stressful." "I cannot be more precise about how much you may earn, since earnings differ from person to person and from experiment to experiment. I can say that most people volunteer to participate again." "I do not have time to describe the experiment in detail, and the nature of the experiment may change from

⁵⁶ In Spain, for example, it is very difficult to reach students by phone.

day to day. Some experiments involve students taking the roles of buyers and sellers in a market-like situation, for example.”

6. Recruit subjects in a manner that minimizes the chances of getting friends or roommates. This is most easily accomplished via telephone recruiting, by calling individual subjects the night before the session, and using a list of phone numbers and names of people who had earlier expressed a general interest in participating on particular weekdays or time periods. This point is probably not important for individual decision-making experiments in which there is no interaction among subjects.

7. Make a list of participants' names so that you can check them off at the door when they arrive. In our experience, you will need to over-recruit by about 25 percent of the number of participants needed for a session when participants are inexperienced. Fewer alternates are needed if participants have had experience in a previous session. More alternates may be needed if you are recruiting directly from a class, for a session that is to take place several days later.

Room Preparation

*1. Reorganize the seats in the room, if necessary, so that it is not possible for participants to read numbers off of others' decision sheets.

*2. Check to be sure that the blackboard is clean or prepared with the T charts for recording bids and asks, and check for chalk and erasers. The T charts should be large enough to be read, but small enough so that lots of data can fit on the same blackboard.

*3. When the session is being conducted for research, arrange for one of the experimenters to arrive about twenty minutes early to ensure that subjects who come early do not talk with one another.

Starting the Session

1. Devise a random device (e.g., a bowl with marked, folded pieces of paper) to be used to assign subjects to roles as buyer or seller. This is particularly important in markets with large cost and value asymmetries.

2. Ask each subject who has been assigned a position to be seated and remain quiet until the session begins; proscribing talking facilitates replication and minimizes the effects of personal relationships.

3. Have an assistant show subjects to their seats while you stay at the door to meet subjects. This is a good time to distribute pens and any “consent form” that may be required by your university (such forms must typically be approved by a human subjects committee).

4. Keep subjects from opening their folders before you begin to read the instructions. This minimizes the possibility that subjects see the private information on each others' decision sheets.

5. If subjects have not participated previously, begin the experiment by making the initial payment and by showing them the cash that you will use to make payments after the session (otherwise some may have doubts about cash payments).

*6. Read the instructions aloud to the students; this creates common knowledge, and it will prevent boredom by ensuring that all finish at the same time. The instructions should not be read too quickly. Read the instructions exactly as they are written. Pause at appropriate times, for example, when subjects are asked to look at a different page or to write responses to questions based on an example. To facilitate replication, do not insert clarifying comments or examples. The urge to interject explanations is a sure sign that the instructions are too brief.

*7. Repeat questions clearly before answering them. Answers should only clarify the instructions. Do not provide new information; feel free to reread the relevant part of the instruction or say that you cannot answer that question. *Never* discuss the goals or anticipated outcomes.

Controlling the Market Trading

*1. The bids and asking prices should be written in relatively small letters and numbers so that the blackboard does not fill up too quickly. Be consistent and keep bids on the left and asking prices on the right. To save time, omit dollar signs and decimals. Insist that participants give their role and identification number (e.g., Buyer 1) before submitting bids and asks. Do not let people speak without being recognized, otherwise you will lose control. To keep roles clear, you should insist that buyers use the word “bid” and sellers use the word “ask,” as in “Buyer 1 bids 140” or “Seller 5 asks 180.”⁵⁷

*2. The auctioneer should be prompted to give warnings when one minute and thirty seconds remain in the trading period. The period should be stopped exactly on time; to do otherwise will encourage traders to delay.

*3. The time between periods should be brief, say a couple of minutes. There should be no talking. If talking is a problem, explain that the instructions specify that participants should remain quiet at all times, as if you are just carrying out orders from above.

4. Have an assistant in the room with subjects at all times to maintain quiet, especially while subjects are being paid after the session in a separate location.

⁵⁷ Alternately you could let sellers use the word “offer” instead of “ask.”

5. To facilitate replication, be consistent about what remains on the chalkboard from one period to the next, either clean it every time or leave the same amount of data up from previous periods.

*6. Have an assistant check earning calculations after the first period. The assistant should also spot check major earning calculations throughout the session. Subjects are typically very honest, but it is necessary to avoid major calculation errors that dilute incentives.

7. In the event of a major error such as trading units from the wrong period, remember that such errors are equivalent to undesired shifts in supply or demand, and therefore that the session is probably useless for any purpose other than training subjects for later sessions. (It is often useful to replicate sessions using subjects who all have previous experience with the trading institution.)

Ending the Session

1. Ensure that subjects leave all instructions, decision sheets, etc. in their folders before being paid.
2. Pay subjects individually in a separate location, hallway, or visually isolated part of the room. Even though the session has ended, privacy in the payment process is important to avoid conditions in which feelings of envy, guilt, or benevolence after one session may affect a subject's behavior in a subsequent session. An assistant should send the subjects to you one at a time to avoid crowding around the payment area.
3. Ensure that subjects write their names, social security numbers, and signatures on receipt forms that you will need for records and to grant reimbursements. Receipt forms should then be placed face down so that other subjects will not be able to see the payment amounts.
4. Subjects should be able to leave the room individually without having to discuss earnings with others; even though you have no control over later hallway discussions.
5. Write a brief report after the session with the date, names of persons present, earnings, experimental design or treatment variables, significant procedural errors, and any salient pattern of the data. One of the least confusing ways to identify experiments is by date, unless you run more than one session on the same day.

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